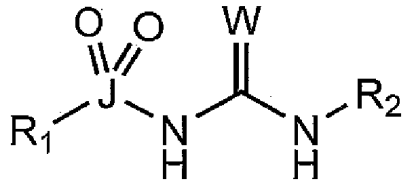
CLAIMS

1. A compound of formula (I), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (I)

wherein, W is selected from O, S and Se;

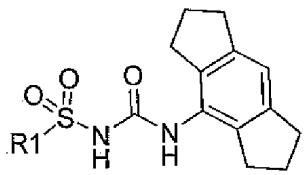
J is selected from S and Se;

R_1 is selected from the group consisting of cycloalkyl, aryl, heteroaryl and heterocyclyl, all of which may be optionally substituted;

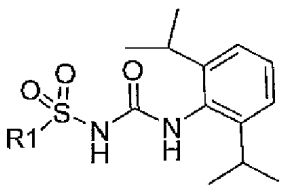
R_2 is selected from the group consisting of cycloalkyl, aryl, heteroaryl and heterocyclyl, all of which may be optionally substituted; and

both R_1 is directly bonded to J and R_2 is directly bonded to the adjacent nitrogen, via a carbon atom.

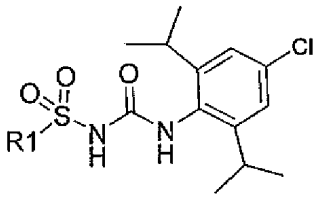
2. The compound of claim 1 wherein the compound is a compound of formula (Ia), (Ib) or (Ic), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



formula (Ia)



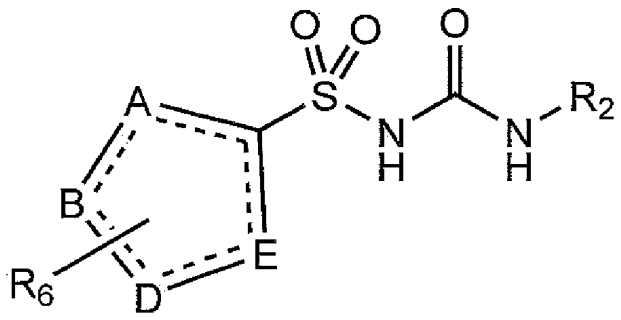
formula (Ib)



formula (Ic)

wherein, R_1 is as defined in claim 1.

3. The compound of any one of the preceding claims wherein the compound is a compound of formula (II), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (II)

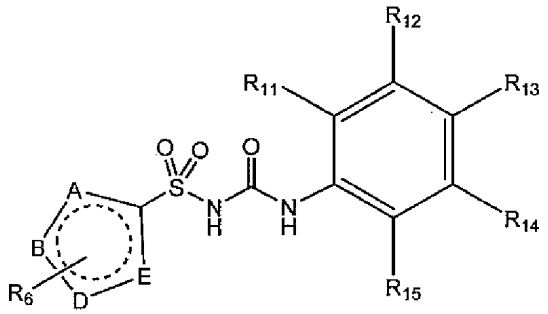
wherein, A, B, D and E are independently selected from C, N, O, S and Se, but at least one thereof is C;

each dashed line may represent a bond;

R_2 is as defined in any one of the preceding claims or R_2 may be a fluorescent group;

each incidence of R_6 is independently selected from the group consisting of hydrogen, halide, cyano, C_1-C_6 alkyl, C_1-C_6 alkylamino, C_1-C_6 alkylhydroxy, C_3-C_6 cycloalkyl, alkylphenyl, phenyl, benzyl, C_1-C_6 ester, C_2-C_6 alkenyl, C_1-C_6 trifluoroalkyl and C_1-C_6 alkoxy, each of which may be optionally substituted, as appropriate, or R_6 may be a fluorescent group.

4. The compound of any one of the preceding claims wherein the compound is a compound of formula (IIa), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (IIa)

wherein R_{11}, R_{12}, R_{13}, R_{14} and R_{15} are independently selected from the group consisting of hydrogen, halo, cyano, amide, sulphonamide, acyl, hydroxyl, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_5 cyloalkyl, C_1-C_6 alkoxy all of which groups may be optionally substituted, as appropriate, with halo, cyano or C_1-C_6 alkoxy; and

wherein R_{11} and R_{12} may combine to form phenyl, a 5- or 6-membered oxygen heterocycle or a 5- or 6-membered nitrogen heteroaryl, each of which may be optionally substituted;

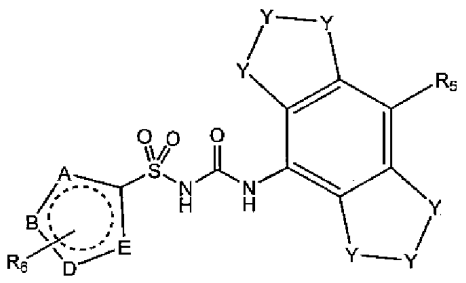
R_{12} and R_{13} may combine to form a 5- or 6-membered nitrogen heteroaryl, which may be optionally substituted;

R_{14} and R_{15} may combine to form a 5- or 6-membered cycloalkyl ring, phenyl, a 5- or 6-membered oxygen heterocycle or a 5- or 6-membered nitrogen heteroaryl, each of which may be optionally substituted;

A, B, D and E are selected from N and C and at least two of A, B, D, and E are N;

each incidence of R_6 is independently selected from the group consisting of hydrogen, halide, cyano, C_1-C_6 alkyl, C_1-C_6 alkylamino, C_1-C_6 alkylhydroxy, C_3-C_6 cycloalkyl, alkylphenyl, phenyl, benzyl, C_1-C_6 ester, C_2-C_6 alkenyl, C_1-C_6 trifluoroalkyl and C_1-C_6 alkoxy, each of which may be optionally substituted.

5. The compound of any one of the preceding claims wherein the compound is a compound of formula (IIb), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (IIb)

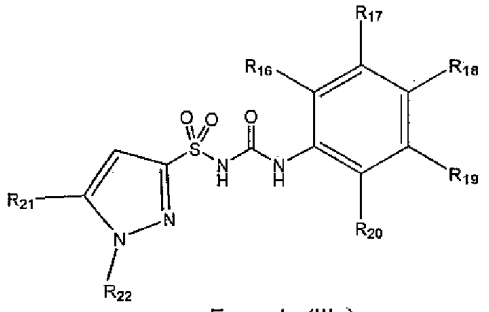
wherein Y is independently selected from C, N, S and O, which may be optionally substituted as appropriate;

R_5 is selected from the group consisting of hydrogen, halo, cyano, amide, sulphonamide, acyl, hydroxyl, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_5 cyloalkyl, C_1-C_6 alkoxy all of which groups may be optionally substituted, as appropriate, with halo, cyano or C_1-C_6 alkoxy;

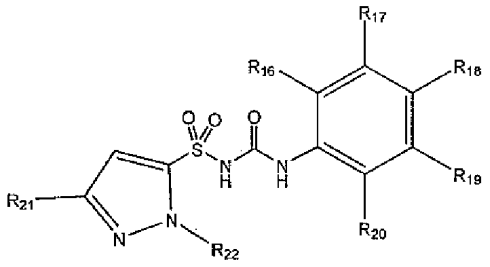
A, B, D and E are selected from N and C and at least two of A, B, D, and E are N;

each incidence of R_6 is independently selected from the group consisting of hydrogen, halide, cyano, C_1-C_6 alkyl, C_1-C_6 alkylamino, C_1-C_6 alkylhydroxy, C_3-C_6 cycloalkyl, alkylphenyl, phenyl, benzyl, C_1-C_6 ester, C_2-C_6 alkenyl, C_1-C_6 trifluoroalkyl and C_1-C_6 alkoxy, each of which may be optionally substituted.

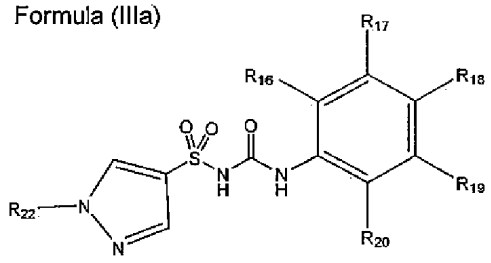
6. The compound of any one of the preceding claims wherein the compound is a compound of formula (IIIa), (IIIb) or (IIIc), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (IIIa)



Formula (IIIb)



Formula (IIIc)

wherein, R_{21} is selected from H, alkyl, perhaloalkyl or hydroxylalkyl;

R_{22} is selected from H, alkyl, perhaloalkyl, C_3-C_6 cycloalkyl, phenyl or benzyl;

R_{18} is H or halogen;

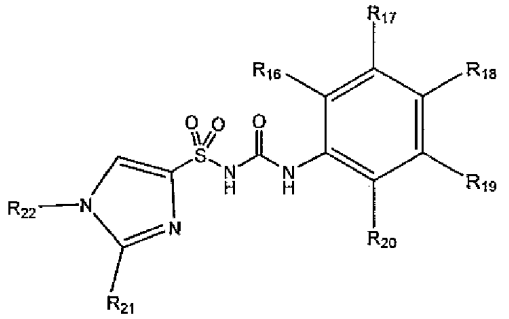
R_{16} and R_{17} are H, alkyl or cycloalkyl; or R_{16} and R_{17}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

R_{19} and R_{20} are H or alkyl; or R_{19} and R_{20}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

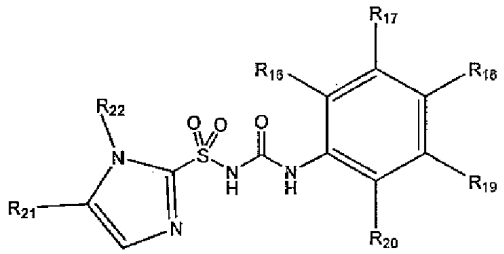
provided that R_{21} and R_{22} are not both H; and

provided that R_{16}, R_{17}, R_{18}, R_{19} and R_{20} are not all H.

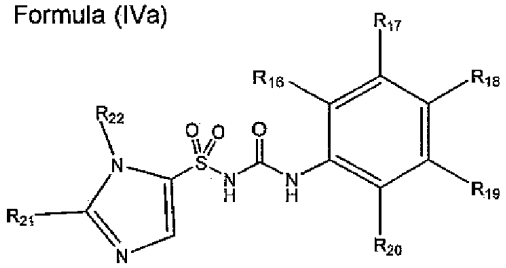
7. The compound of any one of the preceding claims wherein the compound is a compound of formula (IVa), (IVb) or (IVc), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (IVa)



Formula (IVb)



Formula (IVc)

wherein, R_{21} and R_{22} are selected from H, alkyl, perhaloalkyl, hydroxylalkyl, C_3-C_6 cycloalkyl, phenyl and benzyl or R_{21} and R_{22}, together with the carbon atoms to which they are attached, may form a cyclopentyl or a cyclohexyl ring;

R_{18} is H or halogen;

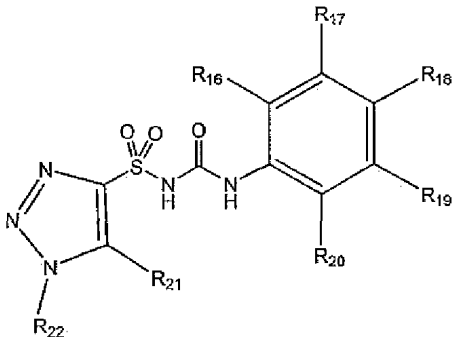
R_{16} and R_{17} are H, alkyl or cycloalkyl; or R_{16} and R_{17}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

R_{19} and R_{20} are H or alkyl; or R_{19} and R_{20}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

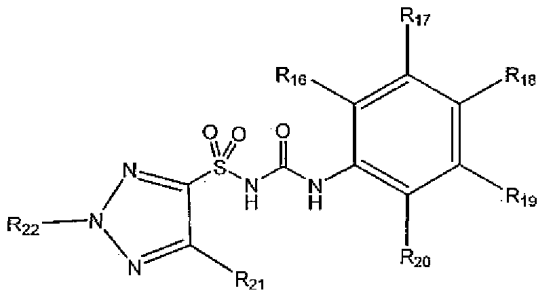
provided that R_{21} and R_{22} are not both H; and

provided that R_{16}, R_{17}, R_{18}, R_{19} and R_{20} are not all H.

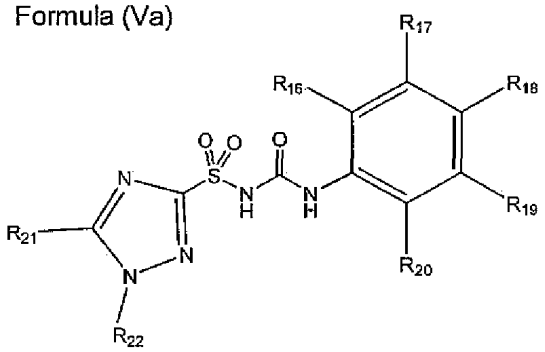
8. The compound of any one of the preceding claims wherein the compound is a compound of formula (Va), (Vb) or (Vc), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (Va)



Formula (Vb)



Formula (Vc)

wherein, R_{21} and R_{22} are selected from H, alkyl, perhaloalkyl, hydroxylalkyl, C_3-C_6 cycloalkyl, phenyl and benzyl;

R_{18} is H or halogen;

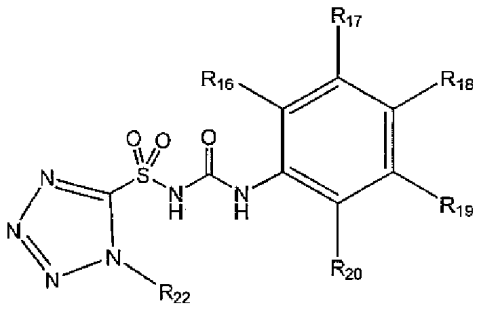
R_{16} and R_{17} are H, alkyl or cycloalkyl; or R_{16} and R_{17}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

R_{19} and R_{20} are H or alkyl; or R_{19} and R_{20}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

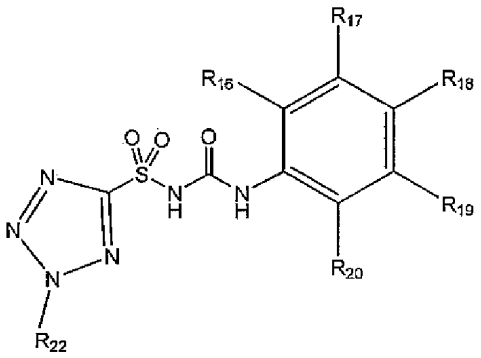
provided that R_{21} and R_{22} are not both H; and

provided that R_{16}, R_{17}, R_{18}, R_{19} and R_{20} are not all H.

9. The compound of any one of the preceding claims wherein the compound is a compound of formula (VIa) or (VIb), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (VIa)



Formula (VIb)

wherein, R_{22} is selected from alkyl, perhaloalkyl, hydroxylalkyl, C_3-C_6 cycloalkyl, phenyl and benzyl;

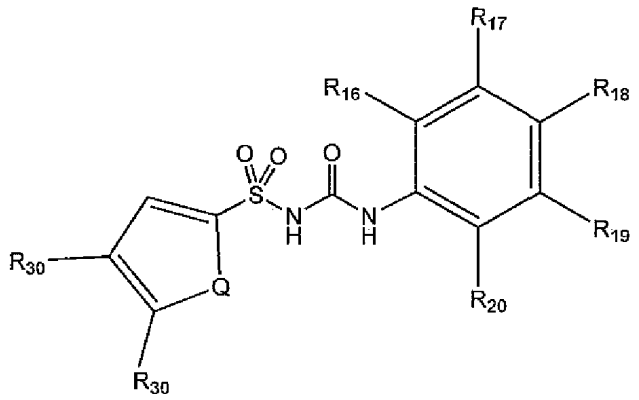
R_{18} is H or halogen;

R_{16} and R_{17} are H, alkyl or cycloalkyl; or R_{16} and R_{17}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

R_{19} and R_{20} are H or alkyl; or R_{19} and R_{20}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S; and

provided that R_{16}, R_{17}, R_{18}, R_{19} and R_{20} are not all H.

10. The compound of any one of the preceding claims wherein the compound is a compound of formula (VII), or a pharmaceutically acceptable salt, solvate or prodrug thereof:



Formula (VII)

wherein, Q is O or S;

each incidence of R_{30} is independently selected from alkyl, perhaloalkyl, hydroxylalkyl, C_3-C_6 cycloalkyl, and alkylamino;

R_{18} is H or halogen;

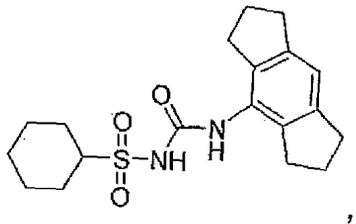
R_{16} and R_{17} are H or alkyl; or R_{16} and R_{17}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

R_{19} and R_{20} are H or alkyl; or R_{19} and R_{20}, together with the carbon atoms to which they are attached, form a 5 or 6 membered ring, said ring being saturated, partially unsaturated or unsaturated, said ring optionally comprising one or two heteroatoms selected from N, O and S;

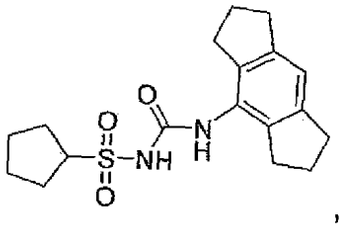
provided that R_{16}, R_{17}, R_{18}, R_{19} and R_{20} are not all H; and

provided that when Q is O and R_{16} and R_{17}, and separately R_{19} and R_{20}, together with the respective carbon atoms to which they are attached, form a cyclopentyl ring then R_{30} is not C_{1-3} hydroxylalkyl.

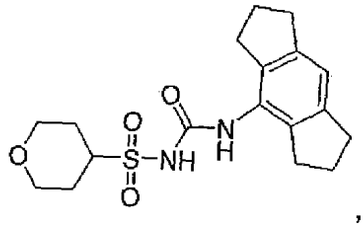
11. The compound of any one of the preceding claims wherein the compound is selected from the group consisting of:



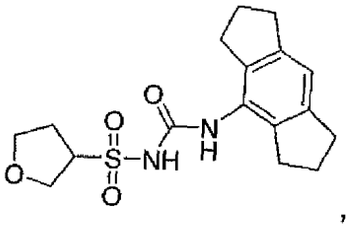
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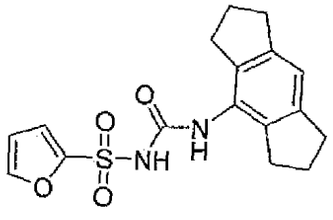
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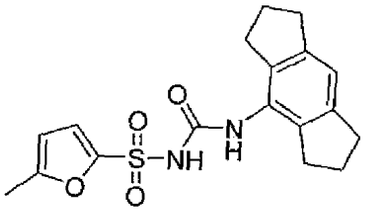
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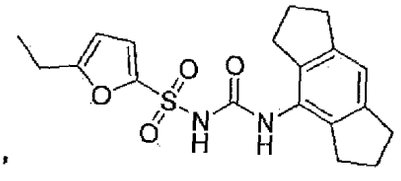
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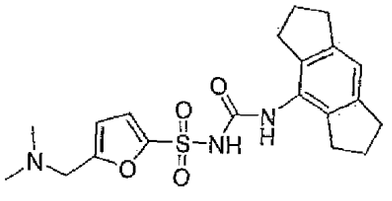
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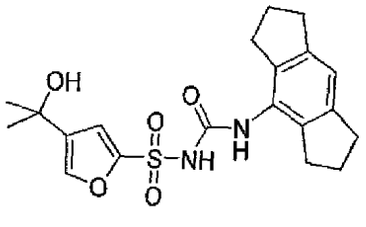
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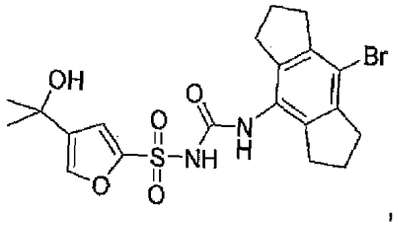
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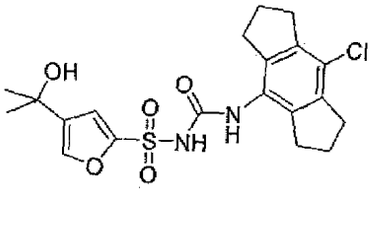


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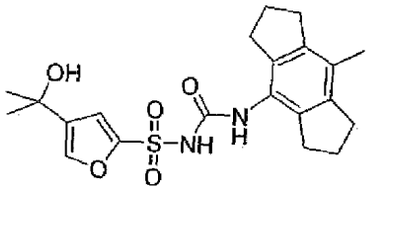
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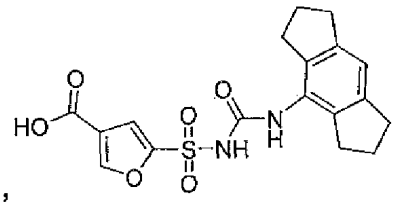
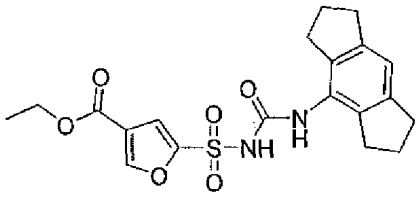
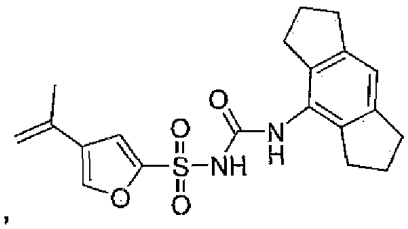
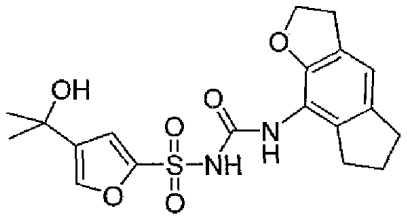
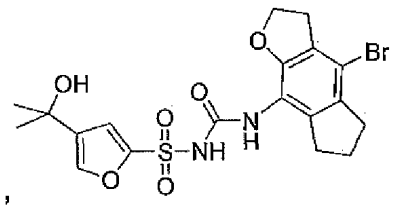
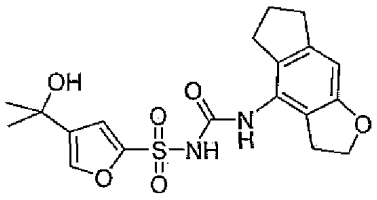
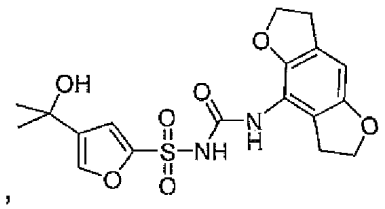
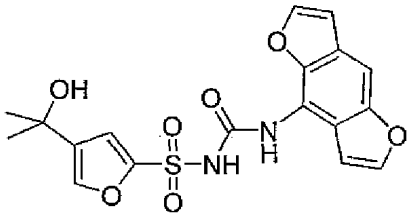
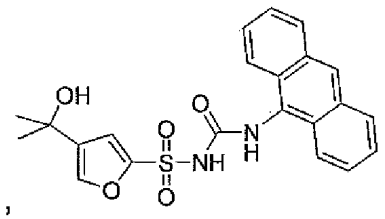
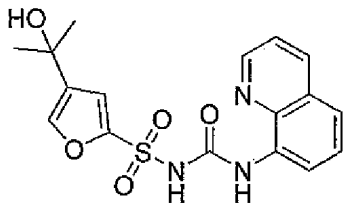
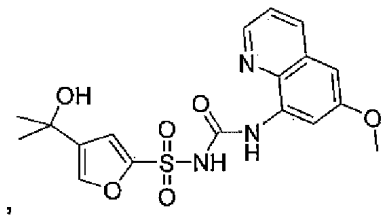
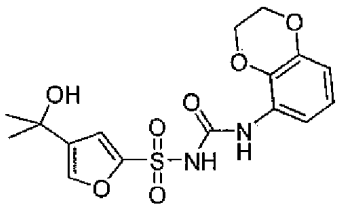
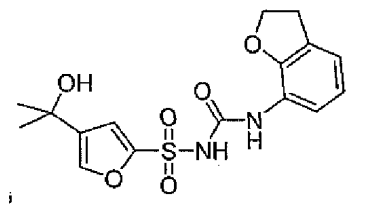
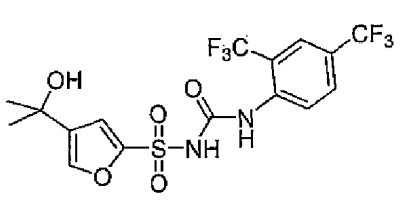
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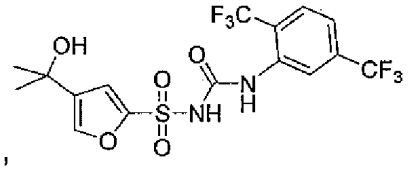
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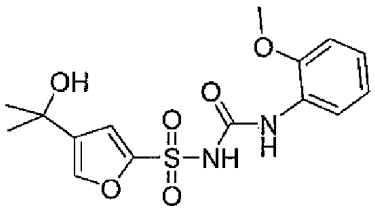

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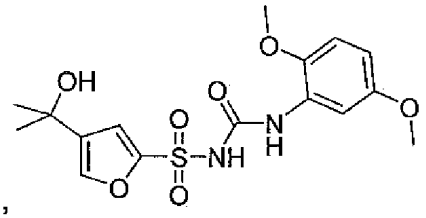
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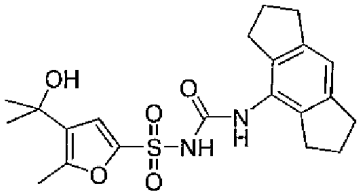
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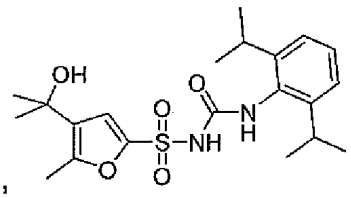
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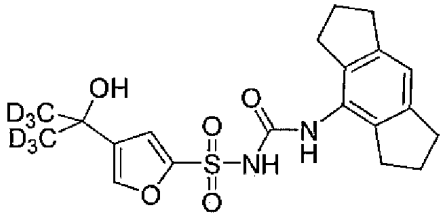
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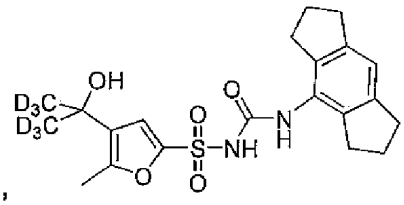
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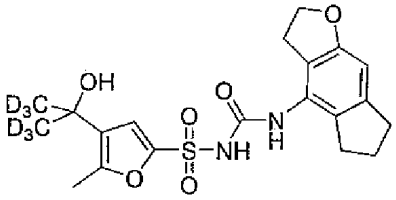
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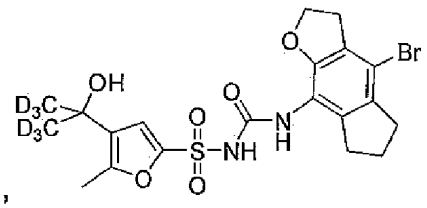
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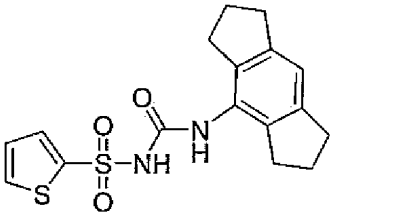
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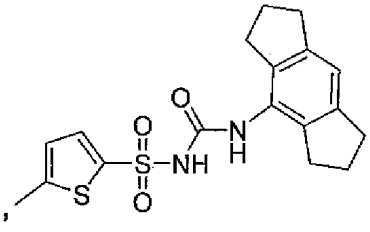
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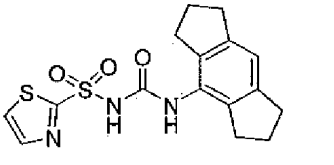
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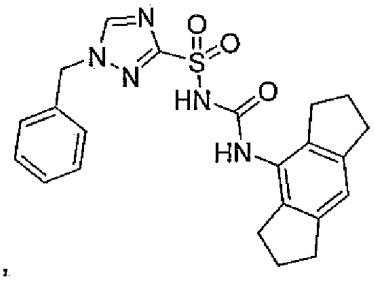


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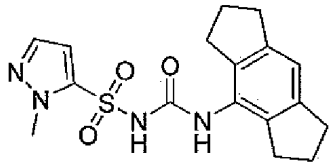


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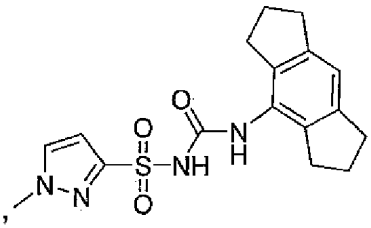




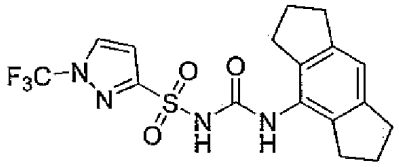
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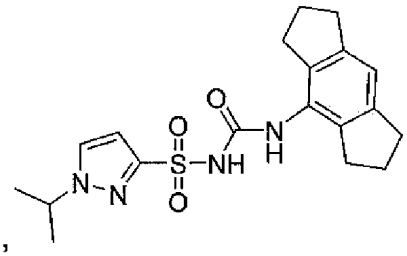


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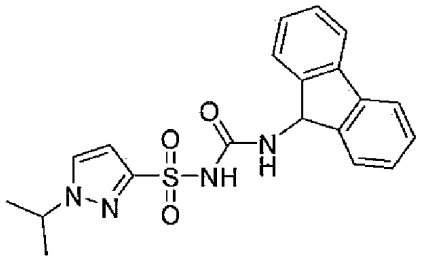


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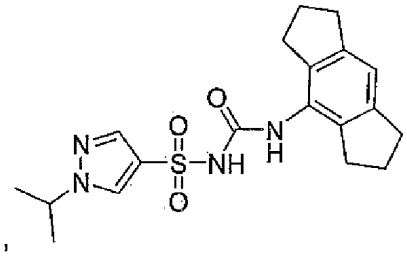




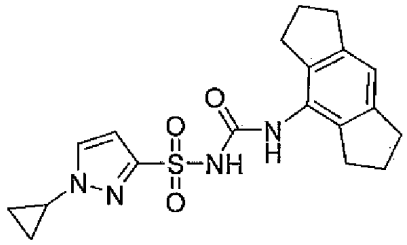
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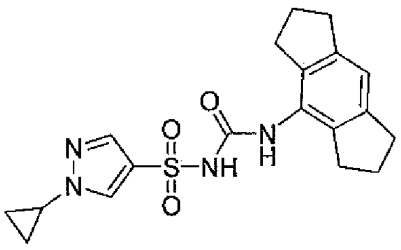
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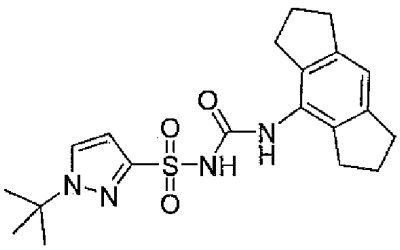
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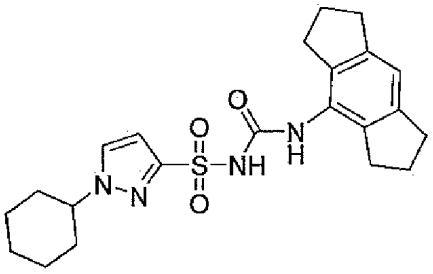
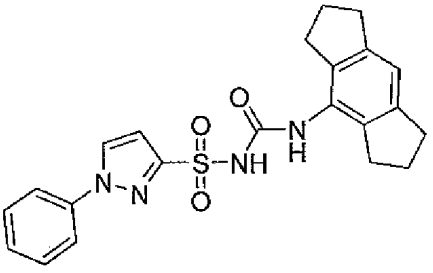
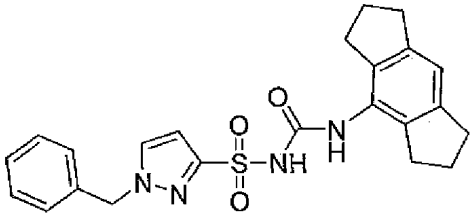
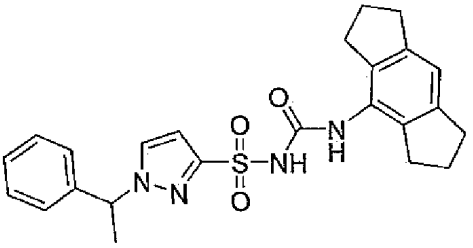
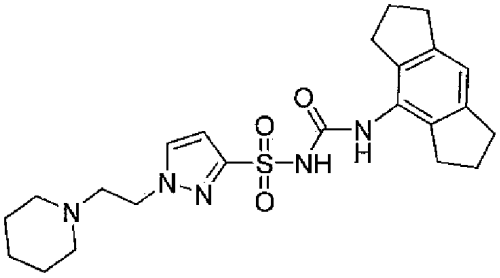
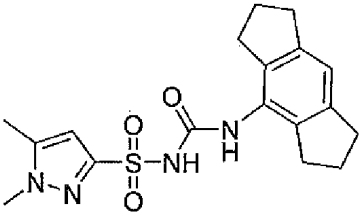
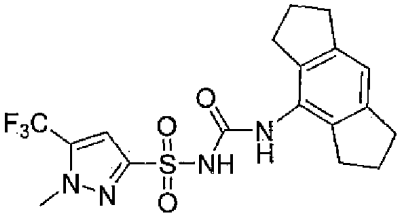
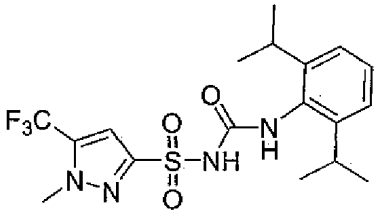
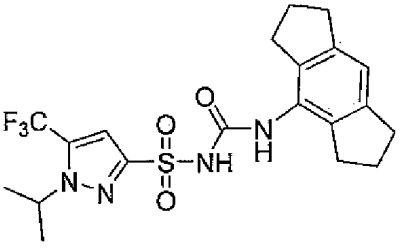
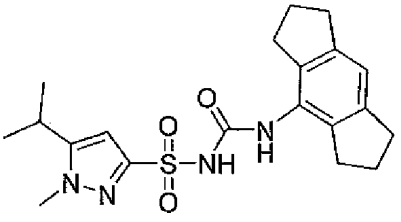
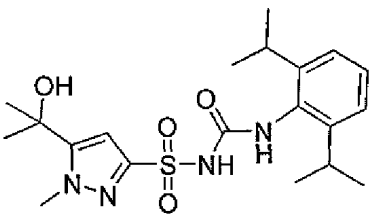
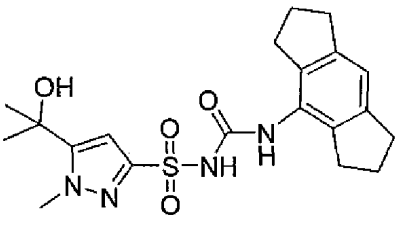
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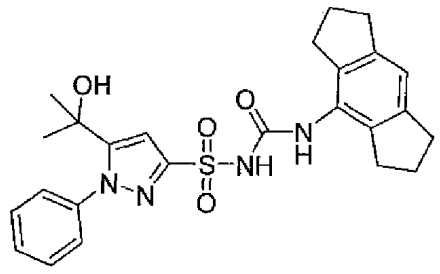
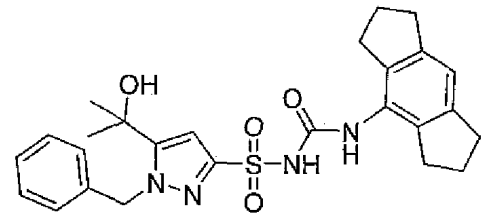
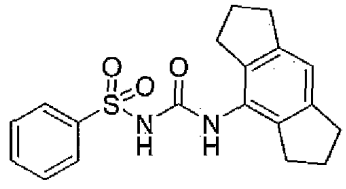
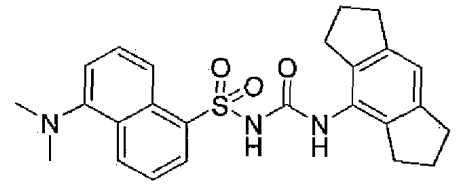
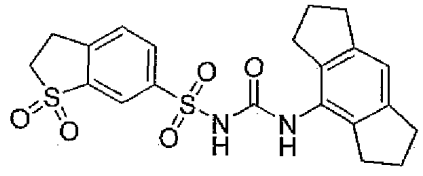
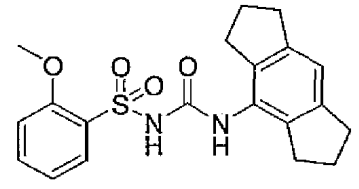
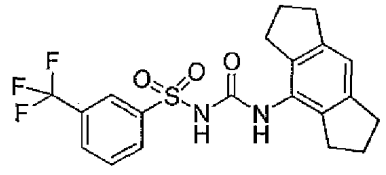
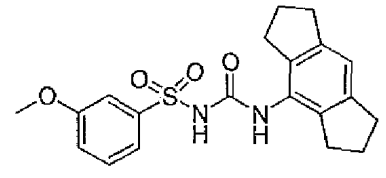
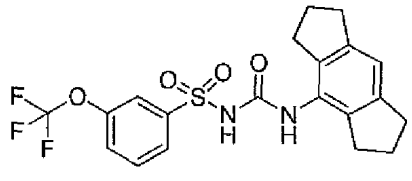
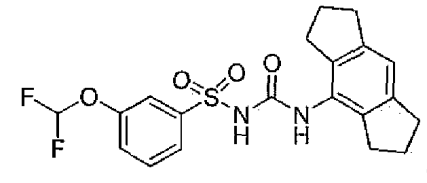
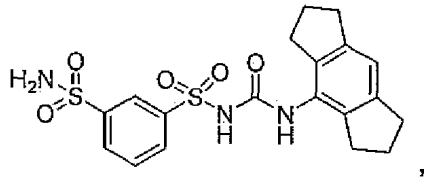
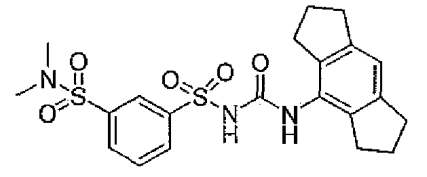
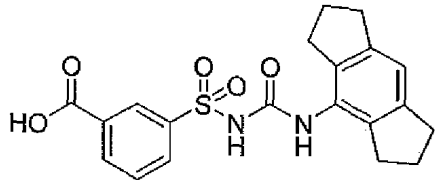
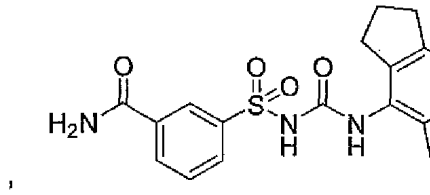


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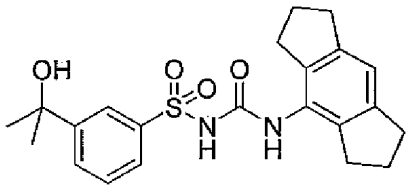
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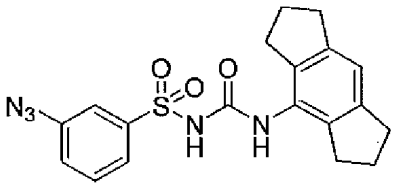

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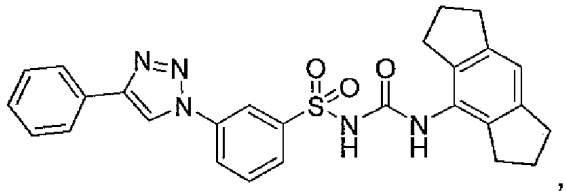

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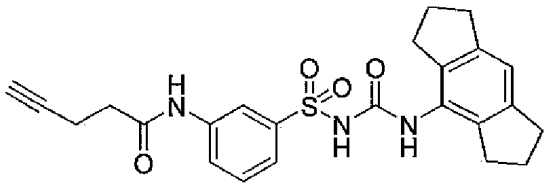
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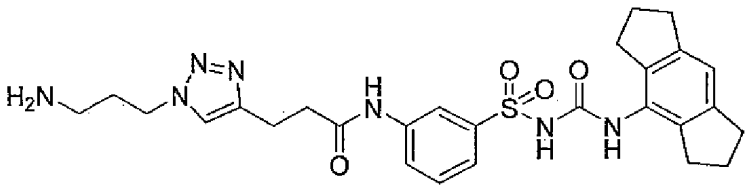
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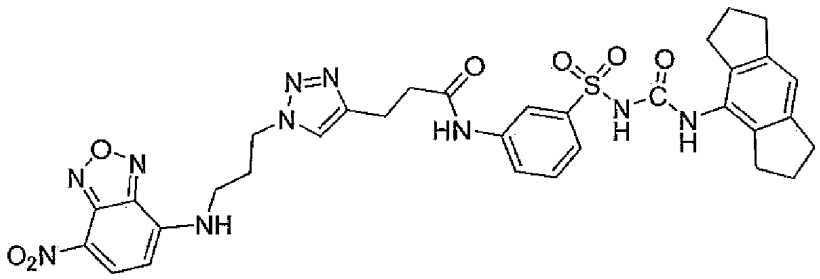


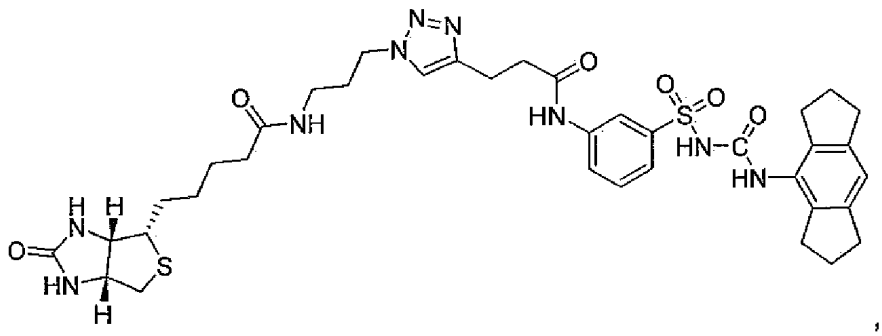


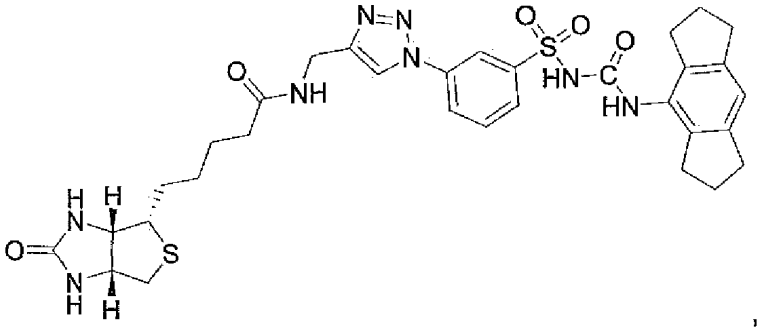


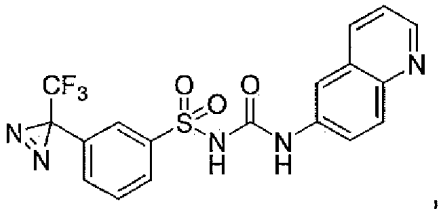


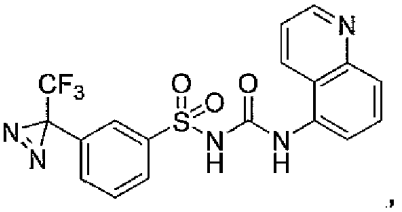


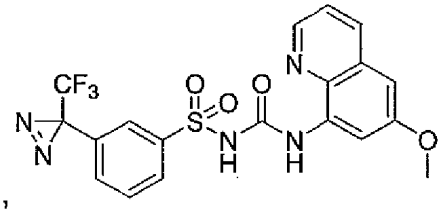


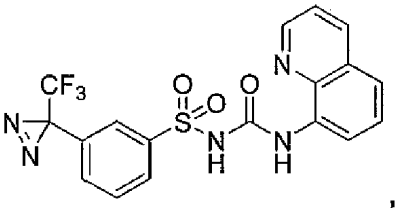


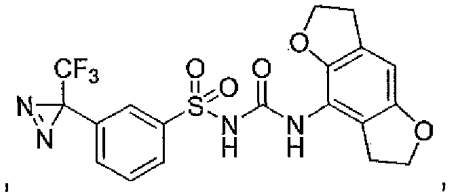


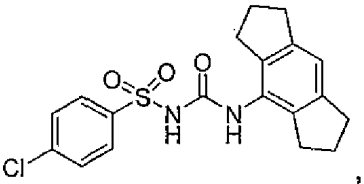


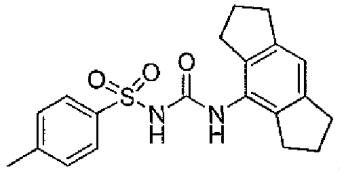


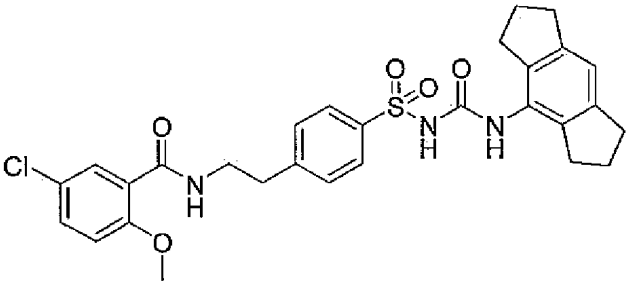


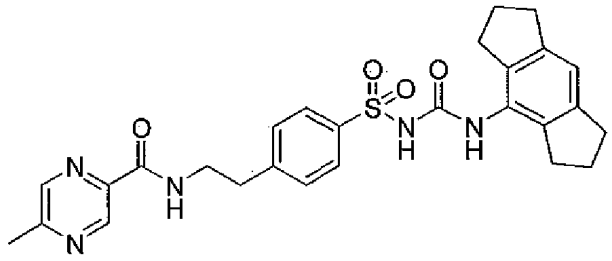


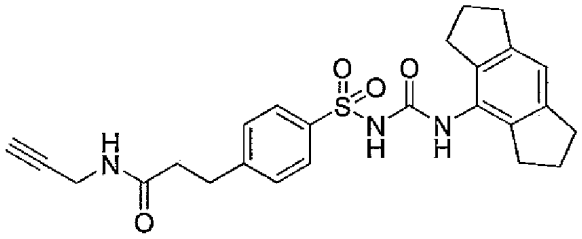




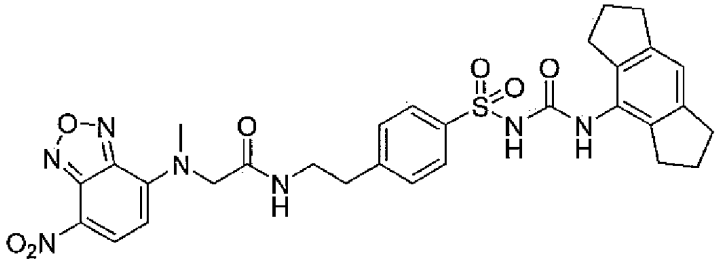




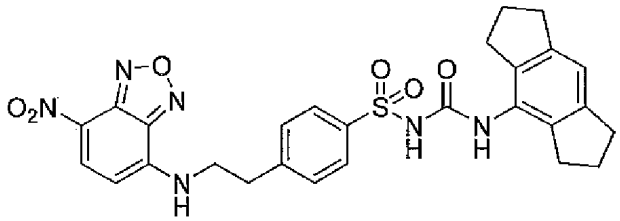




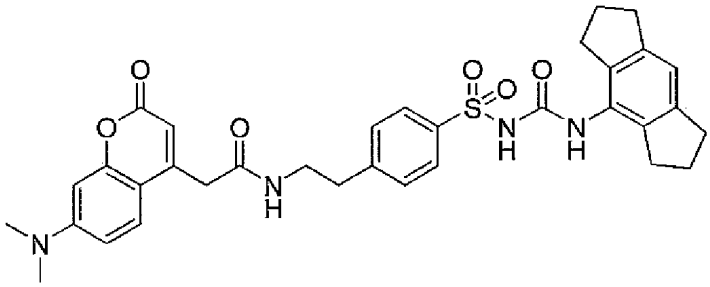
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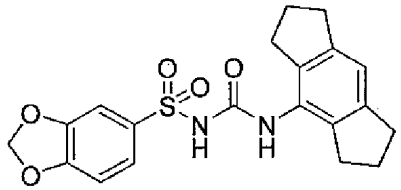
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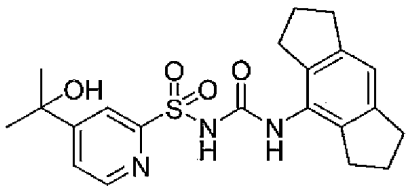
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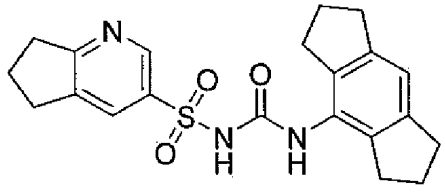
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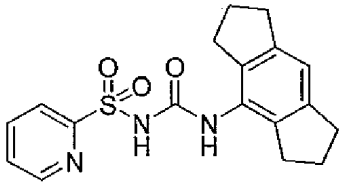
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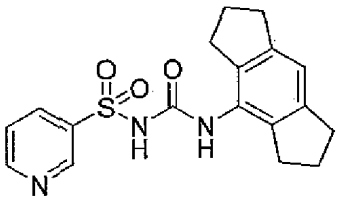
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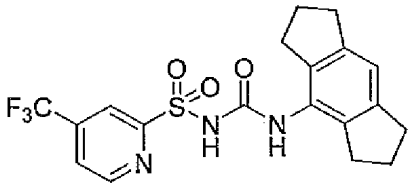
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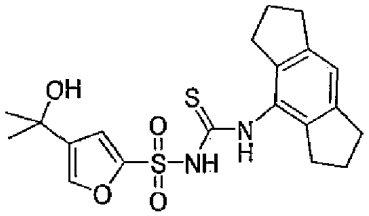
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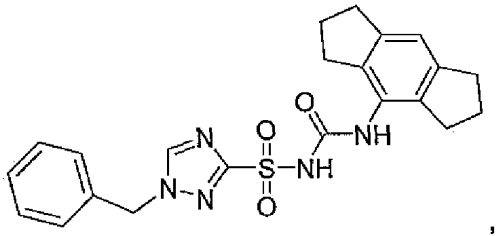
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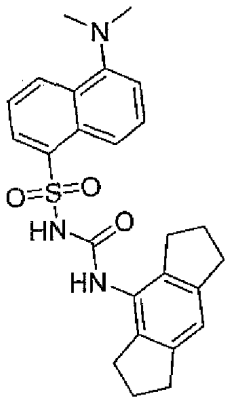
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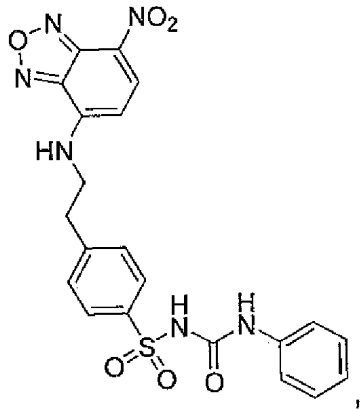
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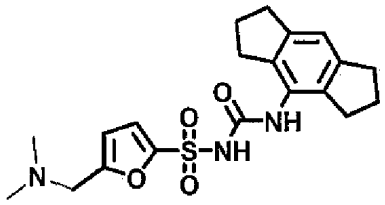
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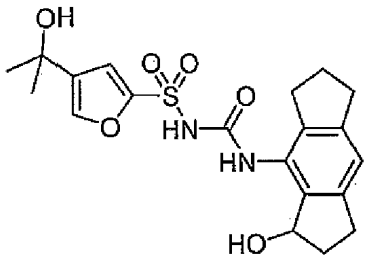
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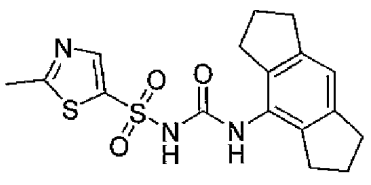
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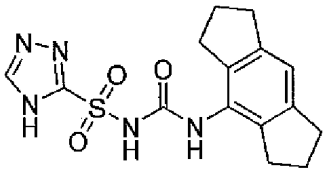
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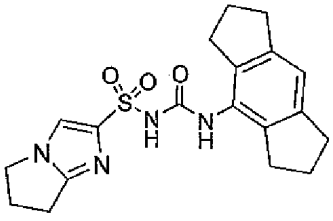
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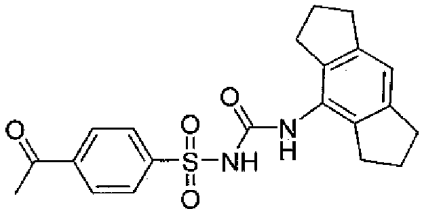
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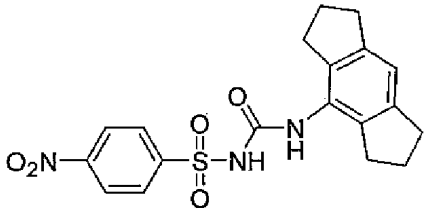
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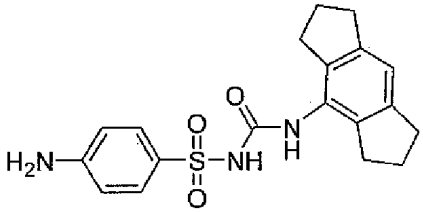
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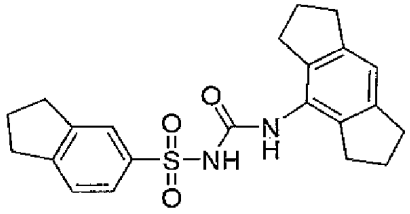
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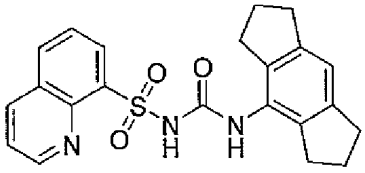
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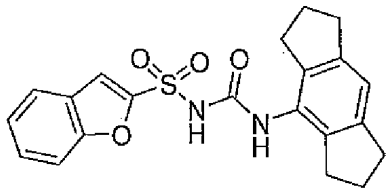
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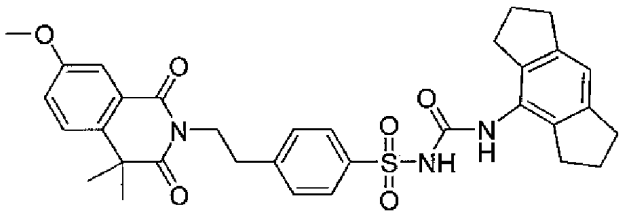
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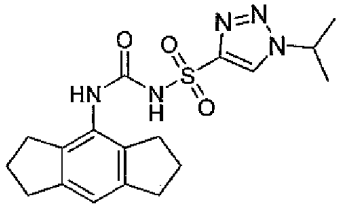
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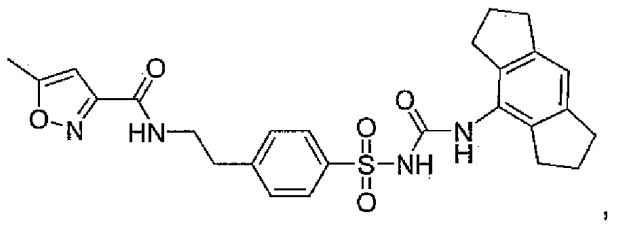
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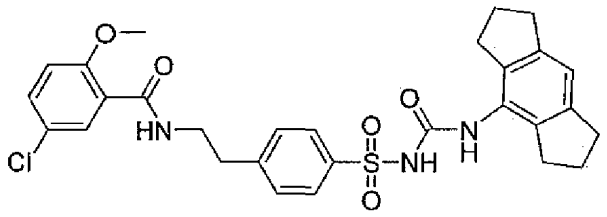


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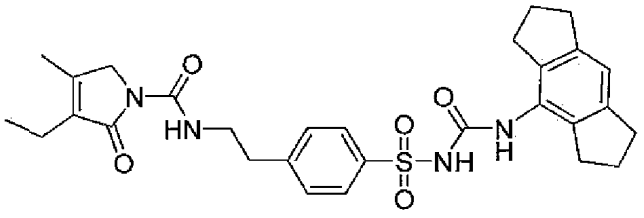


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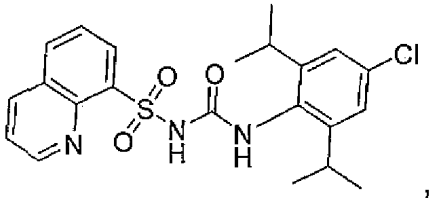
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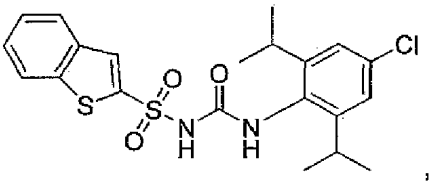
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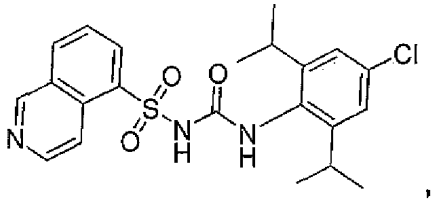
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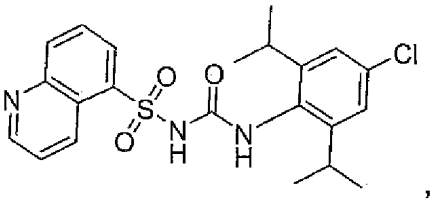
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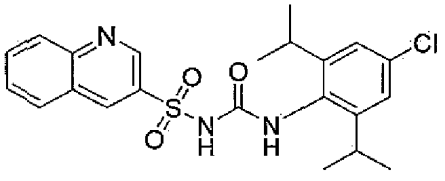
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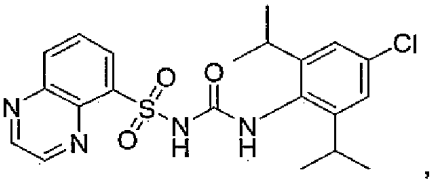
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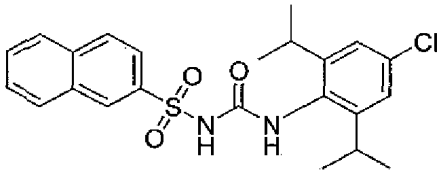
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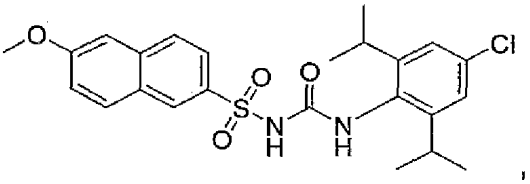
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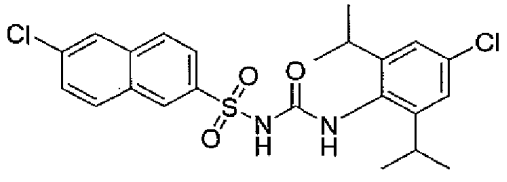
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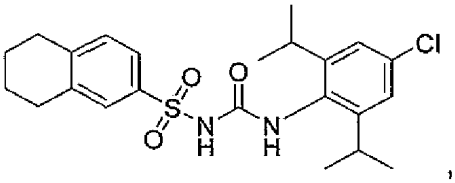
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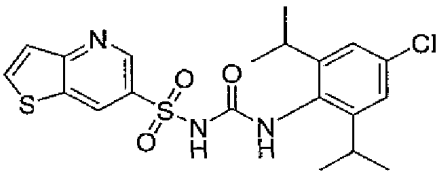
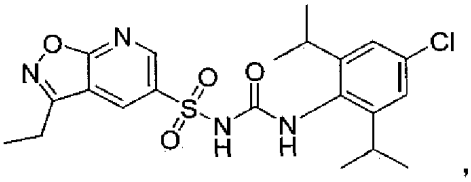
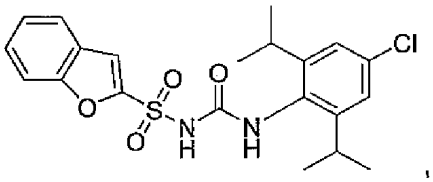
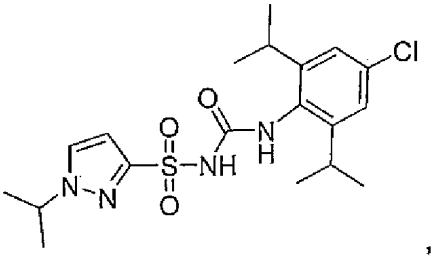
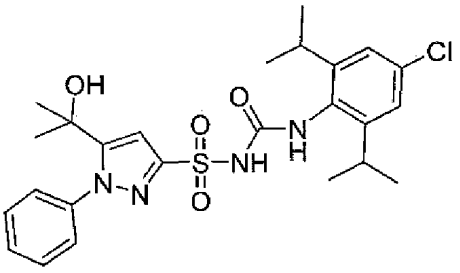
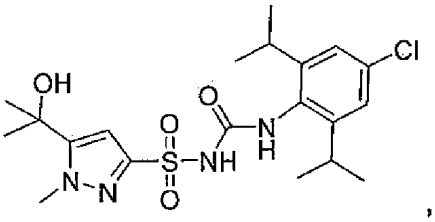
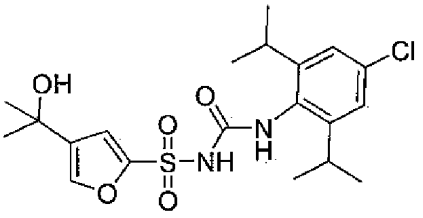
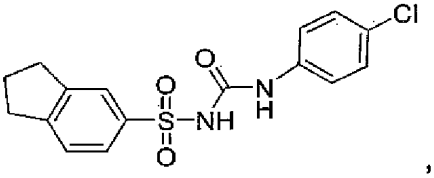
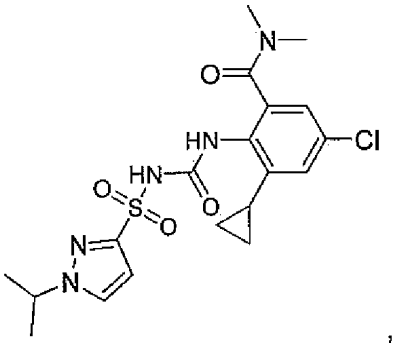
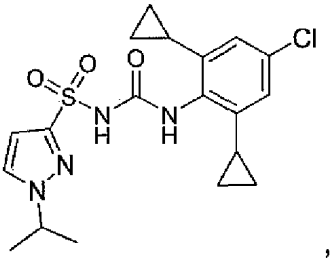
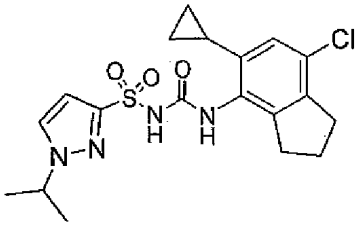
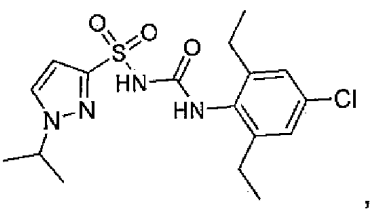
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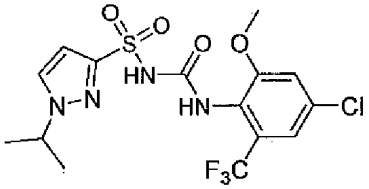


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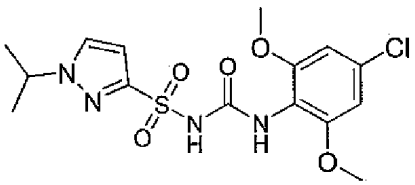


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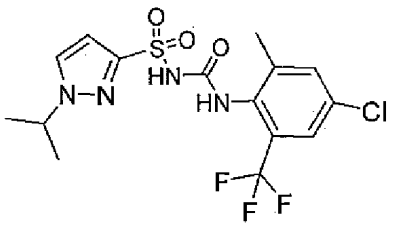

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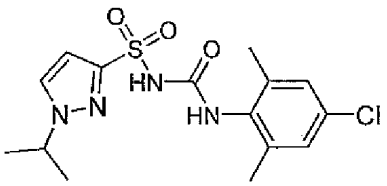
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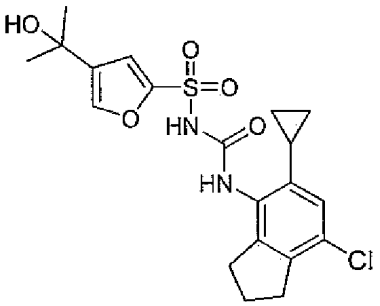
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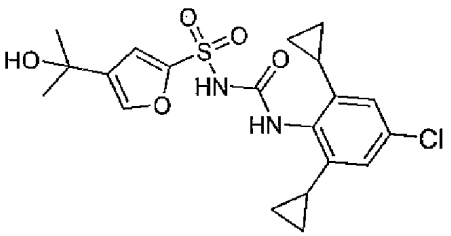
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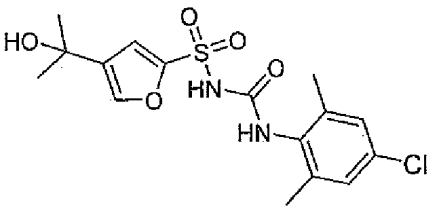
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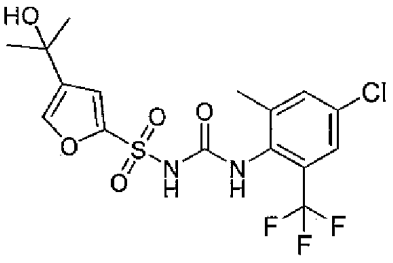
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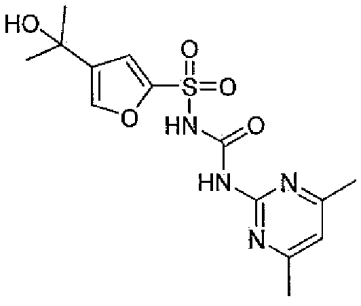
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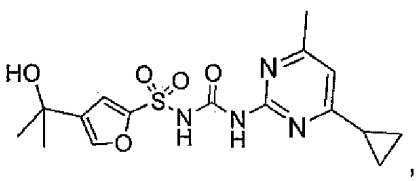
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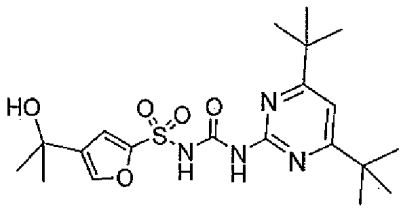
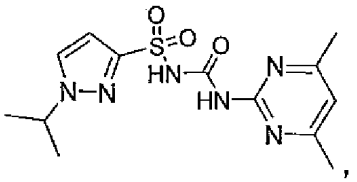
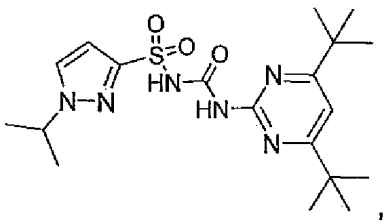
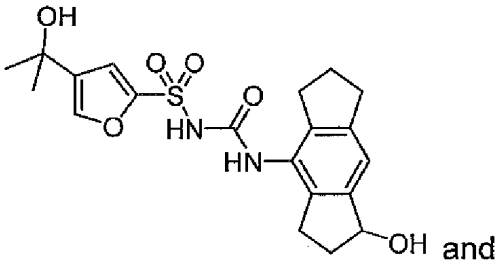
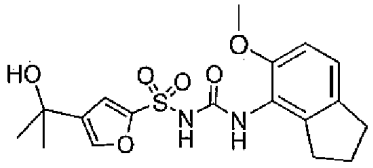
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12. The compound of any one of the preceding claims wherein the compound, or pharmaceutically effective salt, solvate or prodrug thereof, is an inhibitor of the NLRP3 inflammasome.

13. A pharmaceutical composition comprising a compound of any one of claim 1 to claim 12, or a pharmaceutically acceptable salt, solvate or prodrug thereof, and a pharmaceutically acceptable carrier, diluent and/or excipient.

14. Use of a compound of any one of claim 1 to claim 12, or a pharmaceutically effective salt, solvate or prodrug thereof, or the pharmaceutical composition of claim 13 in the manufacture of a medicament for the treatment or prevention of a disease, disorder or condition.

15. The use of claim 14 wherein the disease, disorder or condition is one which is responsive to inhibition of activation of the NLRP3 inflammasome or one which is responsive to modulation of one or more of IL-1β, IL-17, IL-18, IL-1α, IL-37, IL-33 and Th17 cells.

16. The use of claim 14 or claim 15 wherein the disease, disorder or condition is a disease, disorder or condition of the immune system; an inflammatory disease, disorder or condition or an autoimmune disease, disorder or condition; a disease, disorder or condition of the skin; a disease, disorder or condition of the cardiovascular system; a cancer, tumour or other malignancy; a disease, disorder or condition of the renal system; a disease, disorder or condition of the gastro-intestinal tract; a disease, disorder or condition of the respiratory system; a disease, disorder or condition of the endocrine system; or a disease, disorder or condition of the central nervous system (CNS).

17. The use of any one of claim 14 to claim 16 wherein the disease, disorder or condition is selected from the group consisting of constitutive inflammation including the cryopyrin-associated periodic syndromes (CAPS): Muckle-Wells syndrome (MWS), familial cold autoinflammatory syndrome (FCAS) and neonatal-onset multisystem inflammatory disease (NOMID); including autoinflammatory diseases: familial Mediterranean fever (FMF), TNF receptor associated periodic syndrome (TRAPS), mevalonate kinase deficiency (MKD), hyperimmunoglobulinemia D and periodic fever syndrome (HIDS), deficiency of interleukin 1 receptor (DIRA) antagonist, Majeed syndrome, pyogenic arthritis, pyoderma gangrenosum and acne (PAPA), haploinsufficiency of A20 (HA20), pediatric granulomatous arthritis (PGA), PLCG2-associated antibody deficiency and immune dysregulation (PLAID), PLCG2-associated autoinflammation, antibody deficiency and immune dysregulation (APLAID), sideroblastic anemia with B-cell immunodeficiency, periodic fevers, and developmental delay (SIFD); Sweet's syndrome, chronic nonbacterial osteomyelitis (CNO), chronic recurrent multifocal osteomyelitis (CRMO) and synovitis, acne, pustulosis, hyperostosis, osteitis syndrome (SAPHO); autoimmune diseases including multiple sclerosis (MS), type-1 diabetes, psoriasis, rheumatoid arthritis, Behcet's disease, Sjogren's syndrome and Schnitzler syndrome; respiratory diseases including chronic obstructive pulmonary disorder (COPD), steroid-resistant asthma, asbestosis, silicosis and cystic fibrosis; central nervous system diseases including Parkinson's disease, Alzheimer's disease, motor neuron disease,

Huntington's disease, cerebral malaria and brain injury from pneumococcal meningitis; metabolic diseases including Type 2 diabetes, atherosclerosis, obesity, gout, pseudo-gout; ocular diseases including those of the ocular epithelium, age-related macular degeneration (AMD), corneal infection, uveitis and dry eye; kidney disease including chronic kidney disease, oxalate nephropathy and diabetic nephropathy; liver disease including non-alcoholic steatohepatitis and alcoholic liver disease; inflammatory reactions in skin including contact hypersensitivity and sunburn; inflammatory reactions in the joints including osteoarthritis, systemic juvenile idiopathic arthritis, adult-onset Still's disease, relapsing polychondritis; viral infections including alpha virus including Chikungunya and Ross River, and flavivirus including Dengue and Zika viruses, flu, HIV; hidradenitis suppurativa (HS) and other cyst-causing skin diseases; cancers including lung cancer metastasis, pancreatic cancers, gastric cancers, myelodisplastic syndrome, leukemia; polymyositis; stroke; myocardial infarction; Graft versus Host Disease; hypertension; colitis; helminth infection; bacterial infection; abdominal aortic aneurism; wound healing; depression, psychological stress; pericarditis including Dressler's syndrome, ischaemia reperfusion injury and any disease where an individual has been determined to carry a germline or somatic non-silent mutation in NLRP3.

18. A method of diagnosing a disease, disorder or condition in a mammal including the step of administering a labelled compound of any one of claim 1 to claim 12, or a pharmaceutically effective salt, solvate or prodrug thereof, or metal ion chelate complex thereof, to the mammal or to a biological sample obtained from the mammal to facilitate diagnosis of the disease, disorder or condition in the mammal.

19. A method of modulating the activity of a biological target comprising the step of exposing the biological target to a compound of any one of claim 1 to claim 12, or a pharmaceutically effective salt, solvate or prodrug thereof.

20. The method of claim 19 wherein the biological target may be selected from the group consisting of the NLRP3 inflammasome, IL-1β, IL-17, IL-18, IL-1α, IL-37, IL-33 and Th17 cells.